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SOV/20-129-5-30/64

Kinetics of Dehydrogenation of Isopentenes

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii
nauk SSSR (Institute of Organic Chemistry imeni N. D. Ze-
linskiy of the Academy of Sciences, USSR) ✓

SUBMITTED: August 2, 1959

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5.3200

68152

5(3)

AUTHORS: Bogdanova, O. K., Shcheglova, A. P.,
Balandin, A. A., Academician

SOV/20-129-6-26/69

TITLE: Kinetics of Dehydrogenation of Butylene

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 6, pp 1293 - 1296
(USSR)

ABSTRACT: The authors proved in a previous paper (Ref 3) that butadiene is adsorbed on the aluminum chromium catalyst, that the relative adsorption coefficient of butadiene is high, and that its numerical value increases with decreasing temperature. In their investigations of butylene dehydrogenation, N. A. Shcheglova and S. Ya. Psheshetskiy (Ref 4) found a deviating equation (2) which is similar to equation (1) of the authors (Ref 3). Absorption was not considered in deriving equation (2), and it was maintained that the addition of hydrogen and butadiene does not remarkably influence the reaction rate. This contradicts the authors' assumptions mentioned in the beginning. The paper under review describes the investigation of the kinetics mentioned in the title on a mixed oxide catalyst. The investigations were carried out in a device described earlier (Ref 6). The α -butylene used contained about 7% of β -butylene. The pure butylene

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as well as butylene-hydrogen-butadiene mixtures were diluted with steam (1 : 10 mol). The hydrogen content was varied from 21.8 to 75 mol% (Table 1). Figure 1 shows the curves of butylene displacement by hydrogen at 600° (a) and at 620° (b). Table 2 shows the dehydrogenation rates of the mixtures butylene-butadiene at 580, 600, and 625°. The butadiene content was varied between 26.4 and 92%. It appeared that butadiene is formed as well as disintegrated in the catalyst. Its decomposition increases with temperature and its increase in the mixture (Fig 2:1,2). The correction with regard to butadiene disintegration was determined from the results and considered in the data on the reaction of butylene-butadiene mixtures. The curves 3 (Fig 2) were found by subtracting curves 2 from curve 1. The relative adsorption coefficients were computed according to formula (3). For butadiene, this coefficient $z = 4.9$ at 580°. It decreases at 620°: $z_2 = 2.9$. For hydrogen, $z_3 = 0.8$; it depends on temperature between 580 and 620°. Steam does not influence the reaction rate. The reaction constant = 7.26 at 580°, 9.3 at 600°, and 12.1 at 620°. Figure 3 shows

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the linear dependence between $\log k_0$ and the reciprocal absolute temperature. The activation energy, computed from the velocity constants (k_0), was 19.1 kcal, the pre-exponential term of the Arrhenius equation was 5.75. The change of free energy, of heat capacity, and of entropy (Table 3), as well as the displacement of butylene from the active catalyst centers by butadiene due to adsorption (Table 3), could be computed from the adsorption coefficients and their temperature dependence according to known formulas (Ref 7). The adsorption coefficients of butylene, butadiene, and hydrogen (equation (1)) are 1 : 4.9 : 0.8 at 580°, and 1 : 3.7 : 0.8 at 600°. The names of Podbil'nyak and Bushmarin are mentioned in the text. There are 3 figures, 3 tables, and 7 Soviet references.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences, USSR)

SUBMITTED: August 2, 1959

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BALANDIN, A.A.; KONENKO, I.R.; TOLSTOPYATOVA, A.A.

Kinetics of dehydrogenation and dehydration of ethyl and isopropyl alcohols on yttrium oxide. Kin. i kat. 2 no. 6:90Q-906 N-D '61.
(MIRA 14:12)

1. Institut organicheskoy khimii imeni N.D. Zelinskogo AN SSSR.
(Ethyl alcohol) (Isopropyl alcohol)
(Dehydrogenation) (Dehydration (Chemistry))

YUY TSYA-YUN [Yu Chia-yung]; BALANDIN, A.A.; SLOVOKHOTOVA, T.A.

Using gas-liquid chromatography for the quantitative analysis of products of the catalytic transformations of isomeric cresols. Vest. Mosk.Un.Ser.2: khim. 16 no.6:62-66 N-D '61. (MIRA 14:5)

1. Moskovskiy gosudarstvennyy universitet. Kafedra organicheskogo kataliza.

(Cresol) (Catalysis) (Chromatographic analysis)

BALANDIN, A.A.; KHADEKEL', M.L.; PATRIKEYEV, V.V.

Effect of the structure of compounds on the kinetics and direction of their catalytic hydrogenation. Part 1: Conjugation energy and the kinetics of hydrogenation of benzene, pyridine, and pyrrole. Zhur.ob.khim. 31 no.5:1416-1423 My '61. (MIRA 14:5)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo Akademii nauk SSSR.

(Benzene) (Pyridine)

(Pyrrole) (Hydrogenation)

BALANDIN, A.A.; KHIDEKEL', M.L.; PATRIKEYEV, V.V.

Effect of the structure of compounds on the kinetics and direction of their catalytic hydrogenation. Part 2: Hydrogenation kinetics of furan, thiophene, and ferrocene on rhodium. Zhur.ob.khim. 31 no.6:1876-1882 Je '61. (MIRA 14:16)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.
(Furan) (Thiophene) (Iron) (Hydrogenation)

BALANDIN, A.A. (Moskva); TETENI, P. (Moskva)

Kinetics of the dehydrogenation of alcohols of various types on
copper. Zhur. fiz. khim. 35 no.1:62-71 Ja. '61. (MIRA 14:2)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Dehydrogenation) (Copper) (Alcohols)

BALANDIN, A.A.

On the one hundredth anniversary of the birth of N.D. Zelinskii.
Zhur. fis. khim. 35 no.3:481-487 Mr 61. (MIRA 14:3)
(Zelinskii, Nikolai Dmitrievich, 1861-1953)

VASSERBERG, V.E.; BALANDIN, A.A.; MAKSIMOVA, M.P. (Moskva)

Adsorption of lower aliphatic alcohols on alumina catalysts
and the orientation of the adsorbed molecules. Zhur. fiz.
khim. 35 no. 4:858-866 Ap '61. (MIRA 14:5)

1. AN SSSR, Institut organicheskoy khimii im. N.D.Zelinskogo.
(Alcohols) (Adsorption)

89617

5.1190

1209

S/020/61/136/002/026/034
B004/B056

AUTHORS: Vasserberg, V. E., Balandin, A. A., Academician, and
Davydova, I. R.

TITLE: Formation of Radical-like Intermediary Forms of Surfaces in
Heterogeneous Catalysis

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 2,
pp. 377-380

TEXT: The formation of free radicals on the surface of catalysts is dealt with. The experimental material (Refs. 1-14) led many researchers to the assumption that heterogeneous catalysis takes place with the participation of free radicals loosely bound to the catalyst. However, no experimental proof has hitherto been obtained. To supply this proof, the reaction of isopropanol dehydration was chosen, because it takes place at low temperatures in the adsorbed layer, and thus the lifetime of the radical-like complexes could be expected to be longer than at high temperatures. As such complexes are characterized by unpaired electrons, the method was based upon proving their paramagnetism which accelerates

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Formation of Radical-like Intermediary
Forms of Surfaces in Heterogeneous Catalysis

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the para-ortho transformation of hydrogen. In selecting the suitable catalyst, such were not found to be eligible as, like Al_2O_3 , were themselves active catalysts of p-o transformation. MgSO_4 was chosen as a catalyst of alcohol dehydration, because the latter does not activate the p-o transformation below 300°C , and thus does not produce any effect on this transformation at the dehydration temperature ($150-180^\circ\text{C}$). For each experiment, fresh MgSO_4 was used, because a regeneration could not be carried out (reduction and formation of H_2S in hydrogen at 300°C). A continuous-flow glass device was used for the purpose. The catalyst installed in it was annealed at 300°C for 3 hours at 1.10^{-5} mm Hg. Before each experiment, the question was examined as to whether the catalyst itself did not bring about the p-o transformation. For this purpose, a mixture of 50% para- and ortho-hydrogen was in each case made to circulate at the temperature of dehydration in the apparatus, and samples were periodically taken, whose thermal conductivity was examined. For this purpose, a test tube made of molybdenum glass with a tungsten wire ($d = 20\mu$), which had a resistance of 300 ohms at room temperature, was used.

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Formation of Radical-like Intermediary Forms
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Thereupon, evacuation was carried out to $1 \cdot 10^{-5}$ mm Hg, and the ampoule with $i\text{-C}_4\text{H}_9\text{OH}$ was smashed by means of an electromagnet. All processes were carried out under exclusion of oxygen which was also paramagnetic. As soon as the alcohol had evaporated and been adsorbed, a 50% mixture of p- and o- H_2 was introduced, and after 10-15 min samples were taken for determining thermal conductivity. After the experiment had been completed, evacuation to $1 \cdot 10^{-5}$ mm Hg again followed, and the inactivity of the catalyst alone with respect to p-o transformation was again tested with 50% p- and o- H_2 . Experimental results are given in Table 1. The following results were obtained: 1) The 50% p- and o- H_2 mixture undergoes no change in contact with the catalyst, with the vapors of the reaction products and of the alcohol in the absence of a catalyst. 2) In contact with the catalyst, on which the dehydration of the alcohol is carried out, a p-o transformation occurs, which attains 13.5%. This result is considered to be a direct proof of the formation of multiplet complexes with paramagnetic properties. The formation of such complexes is assumed also for other heterogeneous catalytic reactions. Proof is, however, rendered

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difficult by the authors' method because all catalysts used for hydrogenation and dehydrogenation catalyzed the p-o transformation of H_2 themselves but, in the case of catalytic oxidation, paramagnetic oxygen disturbs. Mention is made of N. D. Zelinskiy, V. V. Voyevodskiy, F. F. Vol'konshteyn, N. N. Semenov, Ya. T. Eydua, S. Z. Roginskiy, M. I. Temkin, and S. L. Kiperman. There are 1 figure, 1 table, and 17 references: 15 Soviet, 1 Belgian, and 1 German.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: August 30, 1960

Legend to Table 1: a) Number of experiment; b) quantity of catalyst, g; c) temperature, $^{\circ}C$; d) quantity of initial alcohol, ml; e) duration of circulation, min; f) degree of ortho-para transformation; g) infinite.

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Formation of Radical-like Intermediary Form
of Surfaces in Heterogeneous Catalysis

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Table 1

№ опыта a)	Кол-во ката- лиз., г b)	Темп., °C c)	Кол-во продук- та, г d)	Время реакции, мин e)	Степень превращения, % f)
1	0	180	0,2	бескон.	0
2	0	200	0,4	"	0
3	3,3	156	0,0	"	0
	3,3	156	0,05	15	13,3
	3,3	156	0,05	бескон.	13,3
4	10,7	185	0,0	"	0
	10,7	185	0,4	15	13,5
	10,7	185	0,4	бескон.	13,5
5	11,0	187	0,0	"	0
	11,0	187	0,2	15	5,3
	11,0	187	0,2	бескон.	5,3
6	11,0	183	0	"	0
	11,0	183	0,4	15	13,2
	11,0	183	0,4	бескон.	13,2

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S/020/61/137/003/023/030
B101/B208

AUTHORS: Balandin, A. A., Academician, Vikt. I. Spitsyn, Academician,
Dobrosel'skaya, N. P., and Mikhaylenko, I. Ye.

TITLE: Radioactive catalysts. Dehydration of cyclohexanol on
magnesium sulfate and calcium chloride

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 3, 1961, 628-630

TEXT: The authors reported in a previous paper (Ref. 1: DAN, 121, 495, (1958)) that catalytic dehydration of cyclohexanol was affected by the presence of S^{35} in the catalyst ($MgSO_4$). They have now made a study of the effect of the radiant energy of the isotope on the yield at constant absolute activity of the radioactive catalyst. To compare it with the effect of S^{35} ($E_{max} = 0.167$ Mev) a beta-emitter, Ca^{45} ($E_{max} = 0.254$ Mev), was chosen again. Ca^{45} was obtained by irradiating $CaCO_3$ enriched with Ca^{44} with slow neutrons ($0.8 \cdot 10^{13}/cm^2 \cdot sec$). The resultant radioactive

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Radioactive catalysts. Dehydration ...

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isotopes were identified with a scintillation spectrometer equipped with a 100-channel-pulse height analyzer. The presence of Ca^{45} was confirmed. The low gamma activity (0.010 mg.equ Ra per g CaCO_3) was due to an Fe^{59} impurity. CaCO_3 was dissolved by adding 18% HCl , and CaCl_2 was annealed at 400°C . The absolute activity of CaCl_2 was measured by an end-window counter and a 4π counter. Cyclohexanol was dehydrated by a mixture of $\text{MgSO}_4 + \text{CaCl}_2$. MgSO_4 was wetted with a certain amount of a solution of radioactive and inactive CaCl_2 , and heated to 400°C within 2 hr. Table 1 gives the characteristics of the catalysts applied. Dehydration took place at $350\text{--}420^\circ\text{C}$ in an apparatus described in Ref. 1. The content of unsaturated hydrocarbons was determined bromometrically in the reaction products collected in the water-cooled receiver. Pure MgSO_4 proved to be the most active catalyst. Addition of inactive CaCl_2 reduces its activity. Pure CaCl_2 , both the active and the inactive one, was completely

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Radioactive catalysts. Dehydration ...

inert. On the other hand, all mixtures containing Ca^{45} showed an increased catalytic activity as compared with mixtures containing the same amount of inactive Ca. These results are presented in Fig. 2. The numbers correspond to those of the catalysts in Table 1. The radioactive catalysts are denoted by an asterisk. It is concluded that the β -radiation of the isotope does not influence the dehydration kinetics, and that MgSO_4 is excited by the β -particles and by secondary electrons knocked-out by them. Fig. 3a represents the degree of cyclohexanol conversion as a function of the logarithm of the specific activity of the catalyst, and compares it with the data obtained in Ref. 1 for $\text{MgSO}_4 + \text{Na}_2\text{SO}_4$ containing S^{35} . Fig. 3b shows the degree of conversion as a function of radiant power. The increased degree of conversion in the presence of $\text{Ca}^{45}\text{Cl}_2$ is said to be due to the higher energy of its β -particles. There are 4 figures, 1 table, and 1 Soviet-bloc reference.

Instr. Phys. Chem. AS USSR

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BALANDIN, A.A., akademik; BOGDANOVA, O.K.; BELOMESTNYKH, I.P.

Kinetics of the dehydrogenation of ethyl benzene to styrene. Dokl.
AN SSSR 138 no.3:595-597 My '61. (MIRA 14:5)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Dehydrogenation) (Benzene) (Styrene)

25313

S/020/61/138/005/013/025
B103/B215

53300

AUTHORS: Bogdanova, O. K., Balandin, A. A., Academician, and
Belomestnykh, I. P.

TITLE: Effect of the structure of alkyl-aromatic hydrocarbons on
the kinetics of their dehydrogenation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 5, 1961, 1089-1092

TEXT: The authors explain the effect of the introduction of a second radical into the benzene ring of ethyl toluene on the dehydrogenation rate of the ethyl radical. They had already proved (Ref. 1: DAN, 132, No. 2, 343 (1960); Ref. 2: DAN, 138, No. 3 (1961)) that isopropyl benzene (ramified radical) is dehydrogenated faster than ethyl benzene (straight chain). The experiments were conducted in the apparatus of Ref. 1 by the same methods. The reaction rate was bromometrically determined by the method of G. D. Gal'pern (Ref. 3: Tr. Inst. nefti, 4, 141 (1954)) according to the amount of vinyl toluene produced. The catalyzate was also chromatographically analyzed. A mixture of dinonyl-didecyl sebacates (Neozone D content 2 %) 18 % of which was applied to diatomite bricks

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served as liquid phase. The temperature was 524-560°C, the flow rate 1000 ml/1-hr (0.5 ml per 3 min) diluted with H₂O vapor, in the ratio of 1:16 or 1:32. The experiment proceeded far from equilibrium. The amount of by-products (xylene, toluene) in the catalyzate was low. The contact gas contained only 0.2-0.4% of olefins and 0.5-0.9 % of saturated hydrocarbons. The relative adsorption coefficients were determined by measuring the rate of dehydrogenation of ethyl toluene - vinyl toluene (21 moles of vinyl toluene) mixtures. The coefficients z_2 of vinyl toluene drop from 3.8 at 530°C to 1.5 at 560°C. The function $\log z_2 = F(1/T)$ is linear. The coefficient $z_3 = 0.7$ for hydrogen does not change with temperature. The above kinetic results may be expressed by the general kinetic equation for monomolecular reactions in the continuous system (A. A. Balandin, Ref. 7: ZhOKh, 12, 160 (1942)). The dependence of the logarithm of the velocity constant on the reciprocal absolute temperature is also linear. The Arrhenius equation is observed. The energy of activation calculated from these constants is 34.6 kcal/mole and $\log k_0 = 7.3$. On the basis of the adsorption coefficients determined for vinyl toluene on the active surface

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of the catalyst, the authors calculated the changes in free energy, of enthalpy and entropy during the adsorptive displacement from the catalytic surface. The velocity constant of ethyl toluene dehydrogenation (0.731-1.704) at 530-560°C is higher than that of ethyl benzene (0.376-1.055). Hence, the authors conclude that the dehydrogenation of the ethyl radical is accelerated by introducing a methyl radical into the benzene ring. Since vinyl toluene is an important raw material for the production of synthetic rubber (copolymer production), perfumes, etc., the authors studied its dehydrogenation on a mixed oxide catalyst at 580°C and flow rates of 1000, 820, and 570 ml/l·hr. The experiments showed that the vinyl toluene yield (with respect to the flow of ethyl toluene) increased from 42.8 to 56.8 % as the velocity of flow decreases. Since the yields calculated with respect to decomposed ethyl toluene drop from 86.1 to 80.7 %, the authors assume the formation of by-products. Chromatographical studies showed that the amount of toluene increased from 0.6 to 1.4 % (at 570 ml/l·hr) and that of xylene from 4.3 to 10.8 %. 0.1 % of benzene was also formed. The authors therefore conclude that high yields of vinyl toluene are obtainable at 580°C and a high flow rate of ethyl toluene on the oxide catalyst. A. V. Bondarenko is mentioned.

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Effect of the structure of... ²⁵³¹³

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There are 3 figures, 4 tables, and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc. The two references to English-language publications read as follows: T. W. Evans (Ref. 8: J. Chem. Education, 32, 6 (1955); F. G. Buege, (Ref. 9: Ind. and Eng. Chem., 46, 1695 (1954)).

SUBMITTED: February 28, 1961

Card 4/4

TOLSTOPYATOVA, A.A.; BALANDIN, A.A., akademik

Regularities in the catalytic properties of rare earths. Dokl. AN
SSSR 138 no.6:1365-1368 Je '61. (MIRA 14:6)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR i
Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Rare earths) (Catalysis)

ISAGULYANTS, G.V.; BALANDIN, A.A., akademik; POPOV, Ye.I.

Determination of relative adsorption coefficients by isotopic
dilution. Dokl. AN SSSR 139 no.1:139-141 J1 '61. (MIRA 14:7)
(Adsorption) (Radioactive tracers)

KLADUNOVSKIY, Yo.I.; BALANDIN, A.A., akademik, PETROV, Yu.I.

Hydrogenation of α -keto acids over a colloidal palladium catalyst.
Dokl. AN SSSR 139 no.2:377-380 J1 '61. (MIRA 14:7)

1. Institut organicheskoy khimii im N.D. Zelinskogo AN SSSR.
(Acids, Organic) (Hydrogenation)

BALANDIN, A.A., akademik; KARPEYSKAYA, Ye.I.; POLKOVNIKOV, B.D.

Rhenium as a catalyst of hydrogenation. Dokl. AN SSSR 139
no.5:1101-1104 Ag. '61. (MIRA 14:8)

1. Institut organicheskoy khimii im. N.D. Zelinskogo
AN SSSR.

(Rhenium) (Hydrogenation)

~~VALANDIN, A.A.~~
VASSERBERG, V.E.; ~~VALANDIN, A.A.~~, akademik; GEORGIYEVSKAYA, T.V.

Reciprocal effect of reacting molecules at the surface of
dehydration catalysts. Dokl. AN SSSR 140 no.4:859-862 0 '61.
(MIRA 14:9)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Dehydration) (Catalysts)

VASSERBERG, V.E.; BALANDIN, A.A., akademik; GEORGIYEVSKAYA, T.V.

Inhibition of surface reactions on catalysts and the mobility
of adsorbed molecules. Dokl. AN SSSR 140 no.5:1110-1113 0 '61.
(MIRA 15:2)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Dehydration)
(Catalysts)
(Adsorption)

BALANDIN, A.A., akademik; MARUKYAN, G.M.; SEYMovich, R.G.

Catalytic dehydrogenation of alkylphenols. Dokl. AN SSSR.
141 no.3:616-619 N '61. (MIRA 14:11)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Phenol) (Dehydrogenation)

BALANDIN, A.A., akademik; SLOVOKHOTOVA, T.A.; YUY TSZYA-YUN [Yü Chia-yung]

Catalytic demethylation of isomeric cresols to phenol under the
effect of water vapors. Dokl. AN SSSR 141 no.4:839-842 D '61.
(MIRA 14:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Cresols) (Phenol) (Catalysis)

PATRIKEYEV, V.V., BALANDIN, A.A., BUTKOV, H.A.

Investigations carried out at IOKhAnSSSR on gasification of sulfurous petroleum residues.

Report presented at the 12th Conference on high molecular weights compounds devoted to monomers, Baku, 3-7 April 62

RODE, Tat'yana Vladimirovna; BALANDIN, A.A., akademik, otv. red.;
DRAGUNOV, E.S., red. izd-va; KASHINA, P.S., tekhn. red.;
DOROKHINA, I.N., tekhn. red.

[Oxygen compounds of chromium and chromium catalysts] Kis-
lorodnye soedineniia khroma i khromovye katalizatory. Mo-
skva, Izd-vo Akad. nauk SSSR, 1962. 278 p. (MIRA 15:3)
(Catalysts, Chromium)

BALANDIN, A.A., akademik, red.; KOBOZEV, N.I., prof., red.; LEBEDEV,
V.P., dots., zam. red.; MAL'TSEV, A.N., zam. red.; AGRONOV,
A.Ye., dots., zam. red.; TOPCHYEVA, K.V., prof., red.; YUR'YEV,
Yu.K., prof., red. PANCHENKOV, G.M., prof., red.; SOKOL'SKIY,
D.V., akademik, red.; VOL'KENSHTYN, F.F., prof., red.; LAZAJEVA,
L.V., tekhn. red.

[Catalysis in the institutions of higher learning; papers of the
First Interuniversity Conference on Catalysis] Kataliz v vysshei
shkole; trudy. Moskva, Izd-vo Mosk. univ. No.1. Pt.2. 1962.
325 p. (MIRA 15:10)

1. Mezhrusskoye soveshchaniye po katalizu. 1st, 1958. 2. Aka-
demiya nauk Kazakhskoy SSR (for Sokol'skiy). -- 3. Khimicheskiy fa-
kul'tet Moskovskogo gosudarstvennogo universiteta (for Yur'yev).
(Catalysis)

BALANDIN, A.A., akad., red.; KOBOZEV, N.I., prof., red.; LEBEDEV,
V.P., dots., zam. red.; MAL'TSEV, A.N., dots., zam. red.;
AGRONOMOV, A.Ye., dots., zam. red.; GROMOV, V.N., red.;
LAZAREVA, L.V., tekhn. red.

[Transactions of the First Interuniversity Conference on
Catalysis] Trudy Meshvuzovskogo soveshchaniia po katalizu, 1st.
Moskva, Izd-vo Mosk. univ. No.1. Pt.1. 1962. 475 p.
(MIRA 16:7)

1. Meshvuzovskoye soveshchaniye po katalizu. 1st. 2. Khimiche-
skii fakul'tet Moskovskogo gosudarstvennogo universiteta (for
Balandin, Kobozev, Lebedev).
(Catalysis—Congresses)

SLOVOKHOTOVA, T.A.; BALANDIN, A.A.; POLETAYEVA, T.I.; YUY TSZYA-YUN
[Yü Chia-yung]

Kinetics of toluene demethylation in the presence of the excess of
water over nickel catalysts. Izv. AN SSSR Otd.khim.nauk no.1:
120-121 Ja '62. (MIRA 15:1)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Toluene) (Methyl group)

S/062/62/000/001/011/015
B101/B110

AUTHORS: Patrikeyev, V. V., Kozarenko, T. D., and Balandin, A. A.
TITLE: Specific polycondensation of amino acid esters
PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 1, 1962, 170 - 171

TEXT: Experiments showed that the polycondensation of di-alanine methyl ester was greatly accelerated by silica gel. Diketo piperazine (of the cyclic alanine dimer) and polypeptide, ratio 96 : 4, are formed. The molecular weight of the polypeptide was higher than in polycondensation by CO₂. ✓

The effect of silica gel modified by organic substances was studied. Freshly precipitated silica gel produced according to V. V. Patrikeyev et al. (Dokl. AN SSSR, no. 4, 851 (1960)) was treated (1) with 2% diketo piperazine solution (produced from alanine); (2) with 2% tripeptide-alanyl glycol glycine solution; (3) an untreated silica gel sample was used for control. The impregnated silica gels were dried, pulverized, treated on the water bath with perhydrol, washed with hot water, and dried on the

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S/062/62/000/001/011/015
B101/B110

Specific polycondensation of ...

water bath. Then, they were reacted with alanine methyl ester (ratio 1 : 1) at 37°C. The course of reaction was observed by determining, at certain intervals, the content of nonreacted monomer by extracting with ether. About 20% of monomer only was polycondensed after 100 hr without silica gel. With silica gel, monomer consumption was about 90%. The polycondensates were extracted with hot water, and evaporated in vacuo. The linear polymers were adsorbed by an ion exchanger (polystyrene with 4% divinyl benzene, sulfonated under mild conditions), the nonpolar diketo piperazine was eluted with H₂O. The cyclic dimer was identified by Moore and Stein's ninhydrin method (see below). The following was found: The silica gel treated according to (1) yielded a diketo piperazine : polypeptide ratio of 96.5 : 3.5; the silica gel treated according to (2) yielded a ratio of 86 : 14. The control sample (3) had a ratio of 96 : 4. A silica gel pretreated with casein yielded a ratio of 50 : 50. Thus, the specifically modified surface of silica gel acts as a matrix for an oriented, specific polycondensation of amino acids. There are 1 figure, 1 table, and 7 references: 6 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: Moore, W. H. Stein. J. Biol. Chem., 211.

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Specific polycondensation of ...

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B101/B110

907 (1954).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii
nauk SSSR (Institute of Organic Chemistry imeni N. D.
Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: July 3, 1961

Card 3/3

VASYUNINA, N.A.; BALANDIN, A.A.; KAPZHEV, V.I.; RABINOVICH, B.Ya.;
CHEPIGO, S.V.; GRIGORYAN, Ye.B.; SLUTSKIN, R.L.

Production of glycerol and glycols by hydrogenolysis of
xylitol. Khim.prom. no.2:82-86 F '62. (MIRA 15:2)

1. Institut organicheskoy khimii AN SSSR, Vsesoyuznyy nauchno-
issledovatel'skiy institut po pererabotke nefi i gaza i polu-
cheniyu iskusstvennogo zhidkogo topliva, i MONIIS.

(Glycerol)

(Xylitol)

(Glycols)

BALANDIN, A.A.; KUKINA, A.I.; MALENBERG, N.Ye.

Catalytic properties of iron phosphate. Report No.1: Dehydration
of alcohols. Izv.AN SSSR Otd.khim.nauk no.4:574-581 Ap '62.
(MIRA 15:4)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Alcohols) (Dehydration (Chemistry)) (Iron phosphate)

BALANDIN, A.A.; TOLSTOPYATOVA, A.A.; PYN BI-SYAN [P'êng Pi-hsiang]

Catalytic properties of dysprosium oxide with respect to the reaction of drhydrogenation and dehydration of alcohols and dehydrogenation of tetralin. Izv.AN SSSR.Otd.khim.nauk no.6: 974-980 '62. (MIRA 15:8)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Dysprosium oxide) (Catalysis) (Dehydrogenation)

BALANDIN, A.A.; TOLSTOPYATOVA, A.A.; NAUMOV, V.A.

Determination of bond energies of the reacting atoms of organic molecules with the MoO_2 catalyst surface using a kinetic method.
Izv.AN SSSR.Otd.khim.nauk no.7:1150-1154 J1 '62. (MIRA 15:7)

1. Monkovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Chemical bonds) (Molybdenum oxide) (Chemical reaction, Rate of)

TOLSTOPIATOVA, A.A.; BALANDIN, A.A. PYN BI-SYAN [P'ing Pi-hsiang]

Kinetics of dehydrogenation and dehydration of isopropyl alcohol
and dehydrogenation of tetralin of dysprosium oxide. Izv. AN SSSR.
Otd.khim.nauk no.7:1154-1163 J1 '62. (MIRA 15:7)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Chemical reaction, Rate of) (Catalysis) (Dysprosium oxide)

S/062/62/000/008/002/016
B101/B180

AUTHORS: Tolstopyatova, A. A., Ping Pi-hsiang, and Balandin, A. A.

TITLE: Kinetics of the dehydrogenation and dehydration of isopropanol and the dehydration of tetralin on ytterbium oxide

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 8, 1962, 1322-1329

TEXT: Data was obtained on the catalytic dehydration of i-propanol and the dehydrogenation of i-propanol and tetralin on Yb_2O_3 , using methods described earlier (Dokl. AN SSSR, 138, 1365 (1961); Izv. AN SSSR, Otd. khim. n., 1962, 974, 1154). The low specific surface area of the catalyst ($9.1 \text{ m}^2/\text{g}$) precluded capillary condensation and complications due to diffusion. When the catalyst was mixed with quartz powder in a 1:1 ratio, the reaction took place isothermally. z, the relative adsorption coefficient of the reaction products (H_2O , C_3H_8 , acetone, H_2 , naphthalene), and the thermodynamic functions ΔH (kcal/mole), ΔF (kcal/mole), ΔS

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Kinetics of the dehydrogenation ...

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B101/B180

(kcal/mole·deg) were calculated:

dehydration of i-propanol

°C	z_{H_2O}	ΔH	ΔF	ΔS
325	7.23	-18.7	-2.39	-10.4
365	3.48	"	-1.57	-10.3

dehydrogenation of i-propanol

°C	z_{acet}	ΔH	ΔF	ΔS
345	2.56	-21.9	-1.13	-33.5
365	1.54	"	-0.54	"

$z_{C_3H_6}$

329	1.80	-23.8	-0.69	-38.3
360	0.61	"	0.40	"

z_{H_2}

325	0.15	34.7	2.24	54.4
345	0.40	"	1.13	54.5

dehydrogenation of tetralin

z_{napht}

500	1.37	26.5	-0.49	34.9
524.5	2.32	"	-1.35	"

z_{H_2}

500	1.40	-48.4	-0.49	-62.0
530	0.42	"	1.39	-62.1

The real and apparent activation energies and the energy of adsorption of the C, H and O atoms onto the surface of the Yb_2O_3 were calculated from the Card 2/3

Kinetics of the dehydrogenation ...

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B101/B180

above data (the first figure being the apparent value, the second the true value, in kcal/mole): dehydration of i-propanol ϵ_{H_2O} 25.1, 30.6;

dehydrogenation of i-propanol ϵ_{H_2} 20.6, 22.9; dehydrogenation of tetralin

$\epsilon_{H_2}^1$ 34.7, 36.6; Q_{C-cat} 22.1, 19.4; Q_{H-cat} 53.5, 55.1; Q_{O-cat} 52.5, 49.7.

There are 3 figures and 13 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 13, 1962

Card 3/3

BALANDIN, A.A.; FYN BI-SYAN [P'ing Pi-hsiang]; TOLSTOPYATOVA, A.A.

Kinetics of dehydrogenation and dehydration of isopropyl alcohol
and of dehydrogenation of tetralin on gadolinium oxide. Izv.AN
SSSR.Otd.khim.nauk no.8:1330-1336 Ag '62. (MIRA 15:8)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Isopropyl alcohol) (Naphthalene) (Dehydrogenation)

TOLSTOPYATOVA, A.A.; BALANDIN, A.A.; FYN BI-SYAN [P'eng Pi-hsiang]

Kinetics of the dehydrogenation and dehydration of isopropyl alcohol
and of the dehydrogenation of tetralin on thulium oxide. *Izv. AN SSSR.*
Otd. khim. nauk no.9:1524-1533 S 1962. (MIRA 15:10)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Isopropyl alcohol) (Dehydrogenation) (Dehydration (Chemistry))
(Naphthalene)

VASSERBERG, V.E.; BALANDIN, A.A.; MAKSIMOVA, M.P.

Geometric configuration of adsorbate molecules and the dimensions of elementary surface areas in the adsorption layer. Izv. AN SSSR.Otd.khim. nauk no.10:1865-1868 '62. (MIRA 15:10)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Adsorption)

BALANDIN, A.A.; KUKINA, A.I.; TOPTYGINA, E.V.

Hydrogenation of aldehydes and ketones in the presence of iron catalysts. Izv.AN SSSR. Otd.khim.nauk no.11:1925-1932 N '62.
(MIRA 15:12)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Aldehydes) (Ketones) (Hydrogenation)
(Iron catalysts)

BALANDIN, A.A.; PATRIKEYEV, V.V.; SHAKHOVA, S.K.; RITENKO, A.P. (Moscow)

Determination of chemical equilibrium by the differential
thermocouple method. Zhur. fiz. khim. 36 no.9:1952-1957 S '62.
(MIRA 17:6)

1. Institut organicheskoy khimii AN SSSR.

S/062/62/000/011/009/021
B101/B144

AUTHORS: Balandin, A. A., Marukyan, G. M., Lavrovskaya, T. K.,
Seymovich, R. G., and Gryzlova, L. V.

TITLE: Catalytic dehydrogenation of chloro-ethyl benzene

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh
nauk, no. 11, 1962, 2031 - 2036

TEXT: Chloro styrene, an important raw material for polymer chemistry, was obtained by dehydrogenation of chloro-ethyl benzene on a mixed oxide catalyst at 600°C, volume rate 0.2 - 0.35 hr⁻¹. The dehydrogenation was carried out in a continuous apparatus; the chloro-ethyl benzene was diluted with water vapor or CO₂. Preliminary tests with chloro benzene showed that it was not changed by the catalyst in the presence of water vapor, whereas about 50% of it was disintegrated to benzene and HCl in the presence of H₂. The catalyzate, which contained up to 36% chloro styrene and, on heating, formed a solid polymer, was analyzed by gas-liquid chromatography. The chromatograph contained a detector for thermal conductivity, the column was filled with diatomite and 15% dincyl sebacinate

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Catalytic dehydrogenation of...

S/062/62/000/011/009/021
B101/B144

as solid phase, and nitrogen was used as carrier gas. The analysis was made at 130°C. For deciphering the chromatogram, mixtures of possible components of the catalyzate were subjected to comparative chromatography. Ethyl benzene could not be separated from chloro benzene. The chromatographic analysis of six experiments yielded (in % by weight): - composition of the initial substance: o-chloro-ethyl benzene, 48-57; p-chloro-ethyl benzene, 43-48; ethyl benzene, 0-4; composition of the reaction product: benzene, 0.1-0.8; toluene, 0.1-0.8; ethyl benzene + chloro benzene, 1.7-13.2 (the higher values with CO₂ as diluent); styrene, 0.5-7.7 (the higher values in the presence of CO₂); chloro toluene, 1.0-4.0; o-chloro-ethyl benzene, 28.5-44.3; p-chloro-ethyl benzene, 18.6-33.5; o-chloro-styrene, 10.1-18.0; p-chloro styrene, 8.2-19.3. There are 4 figures and 4 tables. The most important English-language references are: S. Freeman, *Analyt. Chem.*, 32, 1304 (1960); H. Nadeon, D. Oaks, *Analyt. Chem.*, 33, 1157 (1961).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)
SUBMITTED: April 3, 1962
Card 2/2

S/204/62/002/004/002/019
E071/E433

AUTHORS: Bogdanova, O.K., Shcheglova, A.P., Balandin, A.A.
TITLE: Catalytic dehydrogenation of the individual isopentenes
into isoprene

PERIODICAL: Neftekhimiya, v.2, no.4, 1962, 442-447

TEXT: Kinetics of dehydrogenation of isomeric isopentenes into isoprene on an oxide catalyst in the temperature range 560 to 620°C at a volume velocity of about 5 h⁻¹ and dilution with steam in a wt ratio of 1:3 were studied. The composition of the products was determined by the method of gas-liquid chromatography. Comparison of the obtained data indicates that an overall degree of transformation of the individual isomers in the abovementioned temperature range varies as follows: 2-methylbutene-2 (53.2 to 71.5%) > 2-methylbutene-1 (72.8 to 80.6%) > 3-methylbutene-1 (90 to 92%). From the obtained experimental data the ratio of the velocity constants of the dehydrogenation reaction for the individual isomers: 2-methylbutene-2 : 2-methylbutene-1 : 3 methylbutene-1 was found to equal 1.44 : 1.15 : 1.0. Dehydrogenation of 2-methylbutene-2 proceeds at a higher velocity
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Catalytic dehydrogenation ...

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E071/E433

than that of the remaining two isomers. Isomerization of the starting hydrocarbons with a shift of the double bond occurs simultaneously with the dehydrogenation reaction. According to the degree of isomerization the isomers can be placed in the following order: 3-methylbutene-1 > 2-methylbutene-1 > 2-methylbutene-2. The most stable structure is that of 2-methylbutene-2 the least stable that of 3-methylbutene-1 with branching in the saturated part of the molecule. At 580 to 620°C, volume velocity of about 4.5 to 5.5 litre per litre of catalyst per hour and a dilution with steam in a ratio of 1:2.5 to 3 by wt, the yields of isoprene amounted to 25 to 41% on passed and 91 to 82% on reacted isopentenes. There are 3 figures and 3 tables. ✓

ASSOCIATION: Institut organicheskoy khimii AN SSSR im.
N.D.Zelinskogo (Institute of Organic Chemistry
AS USSR imeni N.D.Zelinskiy)

Card 2/2

TOLSTOPYATOVA, A.A.; KONENKO, I.R.; BALANDIN, A.A.

Bond energies of carbon, hydrogen, and oxygen atoms of organic molecules with yttrium oxide. Kin. i kat. 3 no.1:103-106 '62.
(MIRA 15:3)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.
(Chemical bonds) (Yttrium oxide) (Catalysis) (Organic compounds)

S/204/62/002/004/005/019

E071/E433

AUTHORS: Belomestnykh, I.P., Bogdanova, O.K., Balandin, A.A.

TITLE: The influence of the structure of hydrocarbons on the kinetics of their dehydrogenation

PERIODICAL: Neftekhimiya, v.2, no.4, 1962, 467-472

TEXT: The influence of the structure of hydrocarbon molecules on the kinetics of their dehydrogenation was studied on isopropylbenzene, ethyl, ethyl-, 1-methyl-3-ethyl-, 1,4-dimethyl-2-ethyl, n.propyl- and diethylbenzenes, using the same oxide catalyst. The experiments were carried out in a straight through apparatus, with dilution of hydrocarbons with steam in a proportion of 1:2 to 3 (by wt), in the temperature range 500 to 560°C with a volume velocity of 0.8 to 1.0 hour⁻¹ (for diethylbenzene temperature range 520 to 620°C at feeding rates of 1500, 700, 500 and 300 ml per litre of catalyst per hour). The velocity of dehydrogenation was determined on the basis of the evolution of hydrogen and alkenylbenzene formed. The compositions of catalysates were analysed by the chromatographic method. It was shown that alkylaromatic hydrocarbons with a branched radical and with substituents in the ring are dehydrogenated with a high

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✓

The influence of the structure ...

5/204/62/002/004/005/019
E071/E433

velocity. From the experimental data the velocity constants of the dehydrogenation reaction were calculated for the individual hydrocarbons and the existence of the logarithmic dependence between the reaction constant and activation energy was confirmed. Changes in free energy, heat content and entropy of the adsorption displacement from active centres of the catalyst were calculated. It was shown that with the catalyst used the dehydrogenation products can be obtained with high yields at 565 to 620°C and high feeding rates: e.g. vinyltoluol can be obtained with a yield per pass of 43 to 57% (feeding rate 0.5 to 1.0 hour⁻¹), divinylbenzene with a yield per pass of 30 to 36% + 22 to 20% of ethylvinylbenzene (feeding rate 0.5 to 0.7 hour⁻¹). There are 7 figures and 3 tables. ✓

ASSOCIATION: Institut organicheskoy khimii AN SSSR
im. N.D.Zelinskogo (Institute of Organic Chemistry
AS USSR imeni N.D.Zelinskiy)

Card 2/2

VASYUNINA, N.A.; BALANDIN, A.A.; MAMATOV, Y.L.; PUSTOVAYA, L.M.

Quantitative determining of polyatomic alcohols in their mixtures.
Gidroliz. i khimichesk. 15 no.3:23-24 '82.

(MIRA 18:3)

1. Institut organicheskoy khimii AN SSSR (for Vasyunina, Balandin, Mamatov). 2. Gosudarstvennyy nauchno-issledovatel'skiy institut gidrolizov i sulfonno-spirovoy promyshlennosti (for Pustovaya).

BALANDIN, A.A.; STSHIZHEVSKIY, V.; TOLSTOPYATOVA, A.A.

Thermal effect of the reaction of alcohol dehydration affecting
the results of kinetic measurements. Vest.Mosk. un. Ser.2:khim.
17 no.1:30-33 Ja-F '62. (MIRA 15:1)

1. Moskovskiy gosudarstvennyy universitet, kafedra organicheskogo
kataliza.

(Alcohols)

(Heat of denervation)

(Catalysis)

BALANDIN, A.A.

Multiplet theory of catalysis. Structural factors in catalysis.
Usp.khim. 31 no.11:1265-1308 N '62. (MIRA 15:12)

1. Institut organicheskoy khimii imeni N.D. Zelinskogo
AN SSSR i Moskovskiy gosudarstvennyy universitet imeni
M.V. Lomonosova.

(Catalysis)
(Chemistry, Physical and theoretical)

BARSOVA, L.I.; PIKAYEV, A.K.; SPITSYN, Vikt.I., akademik; BALANDIN, A.A.,
akademik

Radiolysis of aqueous solutions of certain rhodium compounds.
Dokl.AN SSSR 144 no.2:344-346 My '62. (MIRA 15:5)

1. Institut fizicheskoy khimii AN SSSR i Moskovskiy gosudarstvennyy
universitet im. M.V.Lomonsova.
(Rhodium compounds) (Radiation)

S/020/62/144/003/025/030
B124/B101

AUTHORS: Spitsyn, Vikt. I., Academician, Balandin, A. A., Academician, Barsova, L. I., and Pikayev, A. A.

TITLE: Radiochemistry of aqueous solutions of bivalent palladium salts

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 3, 1962, 588-591

TEXT: The radiolytic reduction of aqueous solutions of 0.1-0.001 M palladous chloride (I), 0.01-0.001 M potassium tetrachloropalladate (II), 0.03 M palladous sulfate (III), and 0.01-0.001 M palladous nitrate (IV) by 0.7-0.9 Mev electrons from a direct-acceleration electron tube has been studied. Irradiation of I, II, III, gives palladium black and irradiation of IV gives palladous hydroxide. The radiochemical yields of palladium were determined by measuring the optical density of the solutions (Fig. 1) at 415 mμ as a function of the time of radiation, with parallel weighing of the precipitated metal. The respective curves were used to determine the radiochemical yield, G(-Pd²⁺), of reduced Pd²⁺. The yield of palladium black, G(Pd), obtained with various radiation doses is determined

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Radiochemistry of aqueous ...

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B124/3101

from the slope of the curves (Fig. 2). $G(\text{Pd})$ and $G(-\text{Pd}^{2+})$ are generally found to increase with decreasing dose rate absorbed, and to be dependent, moreover, on the concentration of the irradiated solution in some way. The reduction of (I) to metallic palladium is incomplete in the presence of palladium black and added metallic palladium (0.0018 g Pd in 8 ml solution) which is probably due to its interaction with the OH radicals and chloride ions present leading to the formation of Pd^{2+} and $[\text{PdCl}_4]^{2-}$ ions and to an increased acidity of the solutions. The relation $G(\text{Pd}) = G_{\text{H}_2\text{O}} + (1/2)[G_{\text{H}} - G_{\text{OH}}]$ (10) is derived. The experimental results

of $G(\text{Pd})$ being somewhat lower is explained by the partial sorption of atomic and molecular hydrogen formed by hydrolysis of the palladium black, and by the partial decomposition of H_2O_2 by palladium. In aqueous solutions of (IV), the formation of $\text{PdO} \cdot x\text{H}_2\text{O}$ is probably due to an increase in the pH as a result of radiation. There are 3 figures and 1 table.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR);
Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

Card 2/4

Radiochemistry of aqueous ...

S/020/62/144/003/025/030
B124/B101

REMITTED: January 29, 1962

Fig. 1. Change of the optical density (at 415 mμ) of a 0.01 M solution of palladous chloride in dependence on the time of radiation (D_0 being the optical density of the original solution and D that of the irradiated solution). Dose rates (ev/ml·sec): (1) $8.6 \cdot 10^{16}$; (2) $9 \cdot 10^{17}$; (3) $9 \cdot 10^{18}$. Legend: (A) min.

Fig. 2. Dependence of the amount of precipitated metallic palladium on the time of radiation for a 0.1 M solution of palladous chloride (the volume of the solution being 6 ml). Dose rate (ev/ml·sec): (1) $8.6 \cdot 10^{17}$; (2) $8.6 \cdot 10^{18}$. Legend: (A) g; (B) min.

Card 3/4 2

POLKOVNIKOV, B.D.; BALANDIN, A.A., akademik; TABER, A.M.

Catalytic properties of platinum metal borides. Dokl. AN SSSR
145 no.4:809-811 Ag '62. (MIRA 15:7)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Borides) (Platinum metals) (Catalysis)

SPITSYN, VIKT, I., akademik; BALANDIN, A.A., akademik; MIKHAYLENKO, I.Ye.;
DOBROSEL'SKAYA, N.P.

Dehydration of isopropyl alcohol on a radioactive tricalcium phosphate
catalyst. Dokl. AN SSSR 146 no.5:1128-1131 C '62. (MIRA 15:10)

1. Institut fizicheskoy khimii AN SSSR.
(Isopropyl alcohol) (Dehydration (Chemistry)) (Calcium phosphate)

BOGDANOVA, O.K.; BALANDIN, A.A., akademik; BELOMESTNYKH, I.P.

Dehydrogenation kinetics of alkylaromatic hydrocarbons as
dependent on their structure. Dokl. AN SSSR 146 no.6:1327-1330
0 '62. (MIRA 15:10)
(Hydrocarbons) (Dehydrogenation)

S/062/63/000/001/003/025
B101/B186

AUTHORS: Maksimova, M. P., Vasserberg, V. E., and Balandin, A. A.

TITLE: Effect of the degree of dehydration of the Al_2O_3 surface on its adsorptive properties and on the elementary area of the molecules adsorbed

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 1, 1963, 17-21

TEXT: The elementary area ω populated by an adsorbed Ar atom or N_2 , C_2H_5OH , $n-C_5H_{12}$ or C_6H_{12} molecules was determined in Al_2O_3 samples calcined at $300^\circ C$ (sample I) up to $1000^\circ C$ (sample IV). The adsorption of Ar and N_2 was measured at $-195^\circ C$, that of the organic compounds at $25^\circ C$. ω_{Ar} was assumed constant at all temperatures and equal to 16.6 \AA^2 . \AA^2 -values found for sample I: $\omega_{N_2} = 17.2$; $\omega_{C_2H_5OH} = 28.2$; $\omega_{n-C_5H_{12}} = 54.2$;

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B101/B186

$\omega_{C_6H_{12}} = 54.5$; for sample IV: 15; 24.3; 46.5 and 44.5, respectively.

ω_{N_2} was almost constant for all Al_2O_3 samples heated to more than $300^\circ C$.

Conclusions: The determination of the specific area of Al_2O_3 catalysts by N_2 adsorption is not affected by the degree of surface dehydration.

The slight changes of $\omega_{C_2H_5OH}$ do not explain the previously observed

(Zh. fiz. khimii, 35, 858 (1961)) large differences of ω when alcohol was adsorbed on Al_2O_3 samples of various origin, which were dehydrated

at $500^\circ C$. The reduction of $\omega_{C_2H_5OH}$ with increasing dehydration may be

explained by formation of highly active oxygen bridges between the aluminum atoms in intensely calcined samples. The ω of the two hydrocarbons varies between physical values. The anomalous increase of ω observed by M. M. Dubinin (Izv. AN SSSR, Otd. khim. n. 1960, 1739) in fluorized silicagels was not observed with Al_2O_3 , although interaction

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between the molecules of the adsorbate is equally possible. Hence, the BET (Brunnauer, Emmett, and Teller) equations can be used for Al_2O_3 as its surface is only slightly inhomogeneous. There are 1 figure and 2 tables. The most important English-language reference is: I. B. Peri, R. B. Hannan, J. Phys. Chem., 64, 1526 (1960).

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo
Akademii nauk SSSR (Institute of Organic Chemistry imeni
N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: April 23, 1962

Card 3/3

ZAKHARYCHEVA, I. I.; ISAGULYANTS, G. V.; BALANDIN, A. A.

Formation of ethane during decomposition of ethyl alcohol on titanium dioxide. Izv. AN SSSR. Otd. khim. nauk no.1:179-180 '63. (MIRA 16:1)

1. Institut organicheskoy khimii im. N. D. Zelinskogo AN SSSR.

(Ethane) (Ethyl alcohol)

KLABUNOVSKIY, Ye.I.; AGRONOMOV, A.Ye.; VOLKOVA, L.M.; BALANDIN, A.A.

Adsorption of racemic and (+) -isomers of 2-butanol on
stereospecific silica gels. Izv.AN SSSR.Otd.khim.nauk/no.2:
228-234 F '63. (MIRA 16:4)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR i
Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Butanol) (Adsorption) (Silica)

FERAPONTOV, V.A.; BALANDIN, A.A.; TOLSTOPYATOVA, A.A.

Catalytic dehydrogenation of ethylbenzene to styrene on
cadmium oxide in the presence of water vapors. Izv. AN SSSR. Otd.
khim. nauk no. 3:414-423 Mr '63. (MIRA 16:4)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Benzene) (Styrene)

TOLSTOPYATOVA, A.A.; BALANDIN, A.A.; NAUMOV, V.A.

Kinetic method used in the determination of bond energies of the reacting atoms of organic molecules having a blue molybdenum oxide surface. Izv. AN SSSR, Otd. khim. nauk no. 3, 423-429 Apr '63.
(MIRA 16:4)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Chemical bonds) (Molybdenum oxides) (Organic compounds)

5/062/63/000/004/002/022

100-100

AUTHOR: Bogdanova, O. K., Balandin, A.A., and Belomestnykh, I. P.

TITLE: Regularities in the catalytic dehydrogenation of alkylaromatic hydrocarbons

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 4, 1963, 611-616

TEXT: The regularities found in studying the effect of the molecular structure of alkylbenzene on the kinetics of their dehydrogenation were examined. It was found the molecular structure of hydrocarbons regularly affects the rate constant, activation energy and reaction constant of dehydrogenation and the thermodynamic function of adsorption displacement on an oxide catalyst. The existence of a logarithmic relationship between the activation energy and the reaction constant was confirmed. A parallelism exists between the change of heat content and entropy during the adsorption displacement by the dehydrogenation products from the active centers of the catalyst. There are 5 figures and 2 tables.

SUBMITTED:

Card 1/1

0002/03/004/003/022

AUTHOR: Tolstopyatova, A.A., Dudrik, L., and Balandin, A.A.

TITLE: Catalytic properties of $\alpha\text{-U}_3\text{O}_8$ in dehydrogenation and dehydration reactions and the bond energies of carbon, hydrogen, and oxygen with the catalyst

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 4, 1963, 616-619

TEXT: The kinetics of the dehydrogenation and dehydration of isopropyl alcohol and the dehydrogenation of tetralin was studied, using $\alpha\text{-U}_3\text{O}_8$ as catalyst. The latter is a mixed acting catalyst, initiating the dehydrogenation and dehydration of isopropyl alcohol and the dehydrogenation of tetralin. The catalytic properties of $\alpha\text{-U}_3\text{O}_8$ in these reactions are analogous to the catalytic properties of ThO_2 . The bonding energy of C, H, and O with $\alpha\text{-U}_3\text{O}_8$ changes in the order $\text{O-catalyst} > \text{H-catalyst} > >$

O-catalyst . There are 3 figures and 3 tables.

ASSOCIATION: Moscow State University, Moscow, U.S.S.R. M.V. Lomonosov Moscow State University, Moscow, U.S.S.R.

1/1

KLABUNOVSKIY, Ye.I.; BALANDIN, A.A.; GODUNOVA, L.F.

Inversion of l-menthone. Izv.AN SSSR Otd.khim.nauk no.5:886-890
Mg '63. (MIRA 16:8)

1. Institut organicheskoy khimii im. N.D.Zolinskogo AN SSSR.
(Menthane--Optical properties)

BALANDIN, A.A.; DUDZIK, Z.; TOLSTOPYATOVA, A.A.

Determination of the bond energies of carbon, hydrogen, and oxygen atoms of organic molecules with copper by using the kinetic method. Izv. AN SSSR. Otd.khim.nauk no.6:996-999 Je '63. (MIRA 16,7)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
(Chemical bonds) (Alcohols) (Copper catalysts)

L 12732-61 EPF(c)/EWP(1)/EWT(m)/P1 AM Pr-L Po-1 RM 1/2
ACCESSION NR: AP3002283 5/0062/63/000/006/0999/1003

AUTHOR: Shcheglova, A. P.; Bogdanova, O. K.; Balandin, A. A.

TITLE: Catalytic dehydrogenation of isomeric isopentanes. Report 1. Dehydrogenation of 2-methylbutene-2

SOURCE: AN SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 6, 1963, 999-1003

TOPIC TAGS: preparation of isoprene, dehydrogenation rate of isomers

ABSTRACT: The object of this work is to study the formation rate of isoprene by individual dehydrogenation of isomeric pentanes (3-methylbutene-1, 2-methylbutene-1, and 2-methylbutene-2) which are obtained through a catalytic dehydrogenation of isopentane. The yield of isoprene, formed in the dehydrogenation of 2-methylbutene-2 using a mixed oxidizing catalyst, is 1.5% at a rate of 400 ml of catalyst per hour and with an increase of temperature from 150 to 200°C increases from 1.5% to 11.5% of the total hydrocarbon used. Simultaneously with the dehydrogenation, the conversion of 2-methylbutene into 2-methylbutane (5.1%) and 2-methylbutene (18.8-26.0%) takes place by means of shifting of the double bond. The composition of the isopentane isomers were determined by gas-liquid chromatography. The work has: 1 table and 3 figures.

Association: Organic Chemistry Inst., Academy of Sciences

Card 1/1

SHCHEGLOVA, A.P.; BOGDANOVA, O.K.; BALANDIN, A.A.

Catalytic dehydrogenation of isomeric isopentenes. Report No.2:
Dehydrogenation of 2-methyl-1-butene and 3-methyl-1-butene. I.
AN SSSR. Ser.khim. no.7:1210-1215 J1 '63. (MIRA 16:9)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Butene) (Dehydrogenation)

SLOVOKHOTOVA, T.A.; BALANDIN, A.A.; YUY TSZYA-YUN [Yu Chia-yung]

Thermodynamics of the reaction of demethylation of toluene
and cresols with water vapor. Khim.prom. no.7:513-517 J1
'63. (MIRA 16:11)

VASYUNINA, N.A.; BALANDIN, A.A.; MAMATOV, Yu.

Hydrogenolysis of xylite. Part 1: Effect of temperature and pressure.
Kin.i kat. 4 no.1:156-162 Ja-F '63. (MIRA 16:3)

1. Institut organicheskoy khimii imeni N.D.Zelinskogo AN SSSR.
(Xylitol) (Hydrogenolysis).

VASYUNINA, N.A.; BALANDIN, A.A.; MAMATOV, Yu.

Hydrogenolysis of xylitol. Part 2: Effect of promoters. Kin.
i kat. 4 no.3:443-449 My-Je '63. (MIRA 16:7)

1. Institut organicheskoy khimii imeni Zelinskogo.
(Xylitol) (Hydrogenation) (Catalysis)

TOLSTOPIATOVA, A.A.; STSHIZHEVSKIY, V.; BALANDIN, A.A.

Effect of the structure of alcohols on the activation energy
of their dehydration on tungsten oxide. Vest. Mosk. un. Ser.
2: Khim. 18 no.3:52-56 My-Je '67. (MIRA 16:6)

1. Kafedra organicheskogo kataliza Moskovskogo universiteta.
(Alcohols) (Dehydration(Chemistry))
(Tungsten oxides)

BALANDIN, A.A., akademik; TOLSTOPYATOVA, A.A.; NAUMOV, V.A.

Bond energies of interaction between organogens and the surface
of oxide catalysts. Dokl.AN SSSR 148 no.4:825-828 F '63.
(MIRA 16:4)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Chemical bonds) (Chemical elements) (Catalysts)

TOLSTOPYATOVA, A.A.; BALANDIN, A.A.; YUY TSI-TSYUAN' [Yü Ch'i-ch'üan]

Kinetics of dehydrogenation and dehydration of isopropyl alcohol and of the dehydrogenation of tetralin on lanthanum oxide. Zhur.fiz.khim. 37 no.10:2220-2227 0 '63. (MIRA 17:2)

1. Institut organicheskoy khimii AN SSSR.

TABER, A.M.; BALANDIN, A.A. akademik; SOKOL'SKIY, D.V., akademik;
POLKOVNIKOV, B.D.

Charging curves of the boride catalysts of Pt-group metals.
Dokl. AN SSSR 152 no.2:379-381 S '63. (MIRA 16:11)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
2. AN KazSSR (for Sokol'skiy)

BALANDIN, A. A.; TOLSTOPYATOVA, A. A.

"Selectivity of catalysis and bond energies."

report submitted to 3rd Intl Cong on Catalysis, Amsterdam, 20-25 Jul 64.

Inst of Organic Chemistry im Zelinskiy, AS USSR, Moscow.

CHERKASOVA, Ye.M.; BALANDIN, A.A., akademik

Structure and anesthetic action of aminocarbinol esters. Dokl. AN SSSR
154 no.6:1409-1411 F '64. (MIRA 17:2)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V.Lomonosova.

ANTIK, L.V.; KLABUNOVSKIY, Ye.I.; BALANDIN, A.A.; LOPATIN, B.V.; PETUKHOV, V.A.

Synthesis and transformations of dihydrodioxotribenzotriptycene.

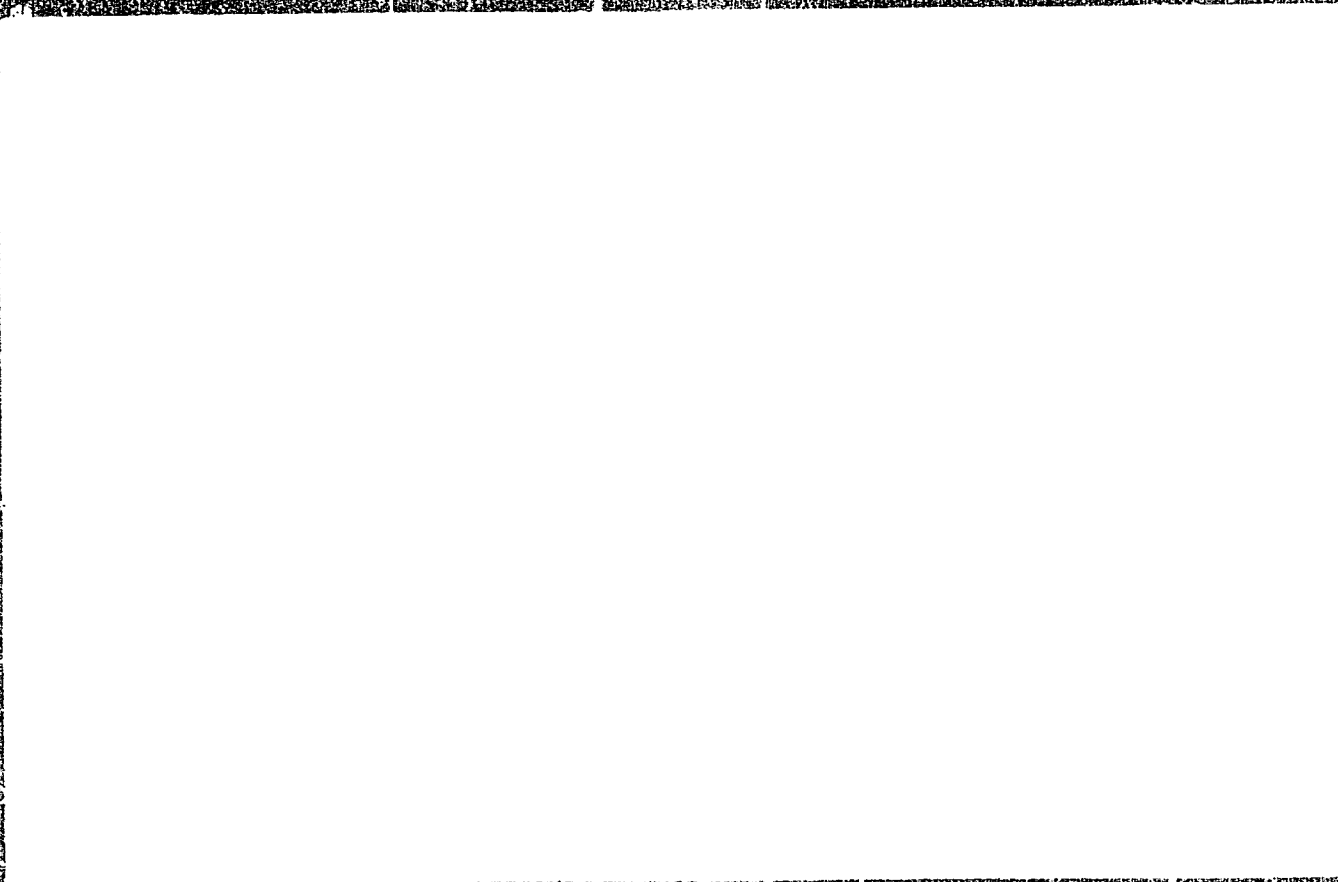
Izv. AN SSSR Ser. khim. no.7:1260-1267 J1 '64.

(MIRA 17:8)

1. Institut organicheskoy khimii imeni Zelinskogo AN SSSR.

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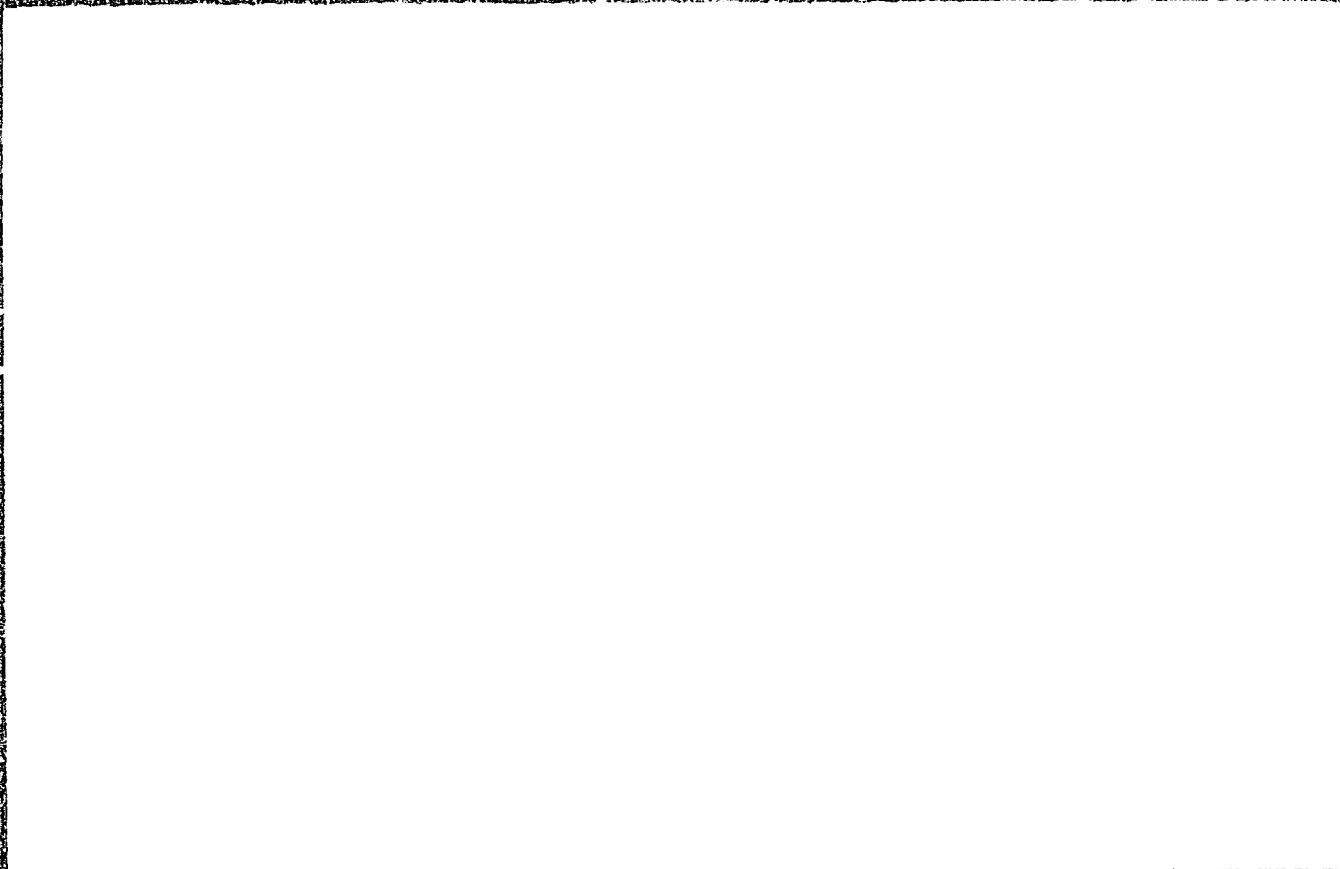


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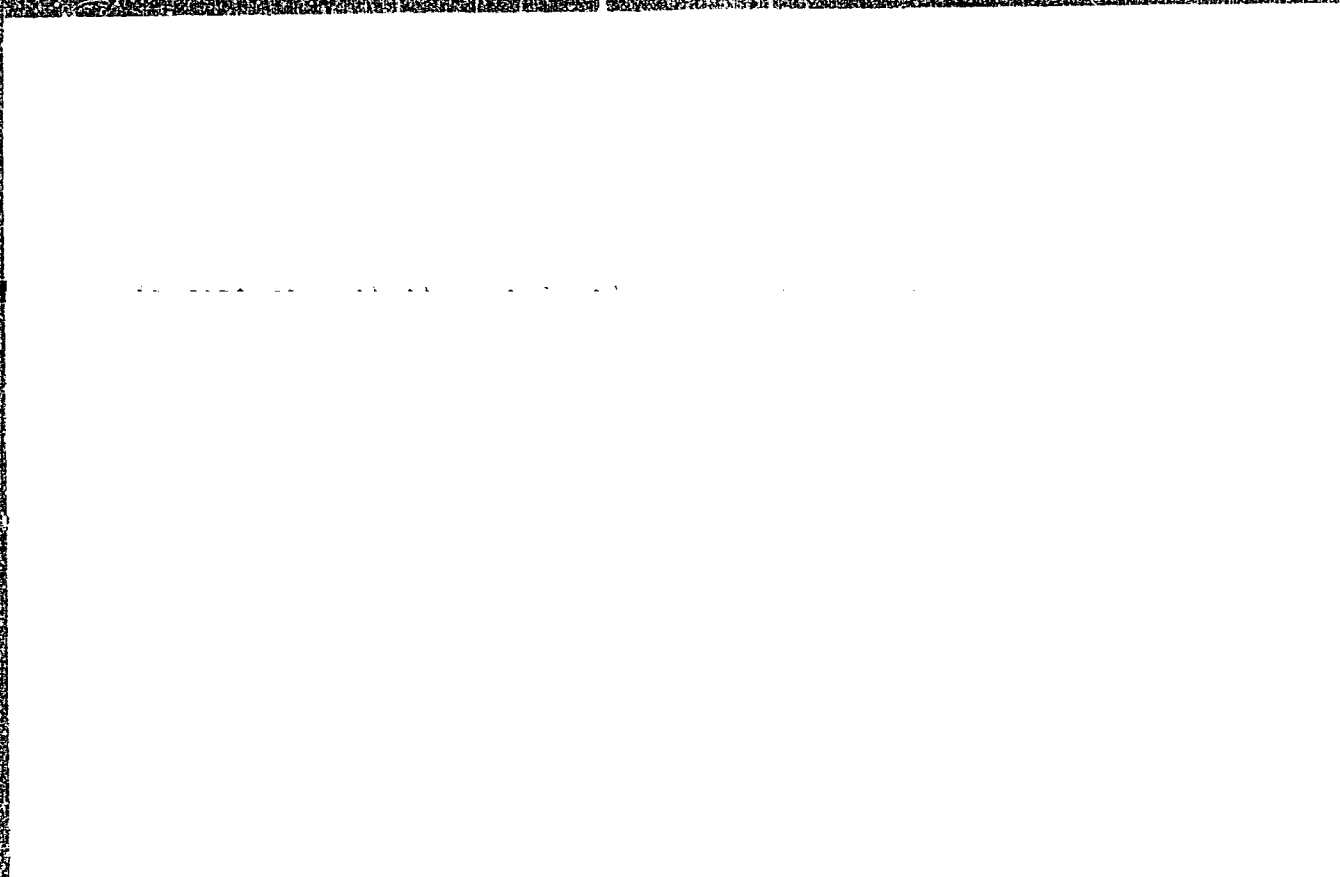


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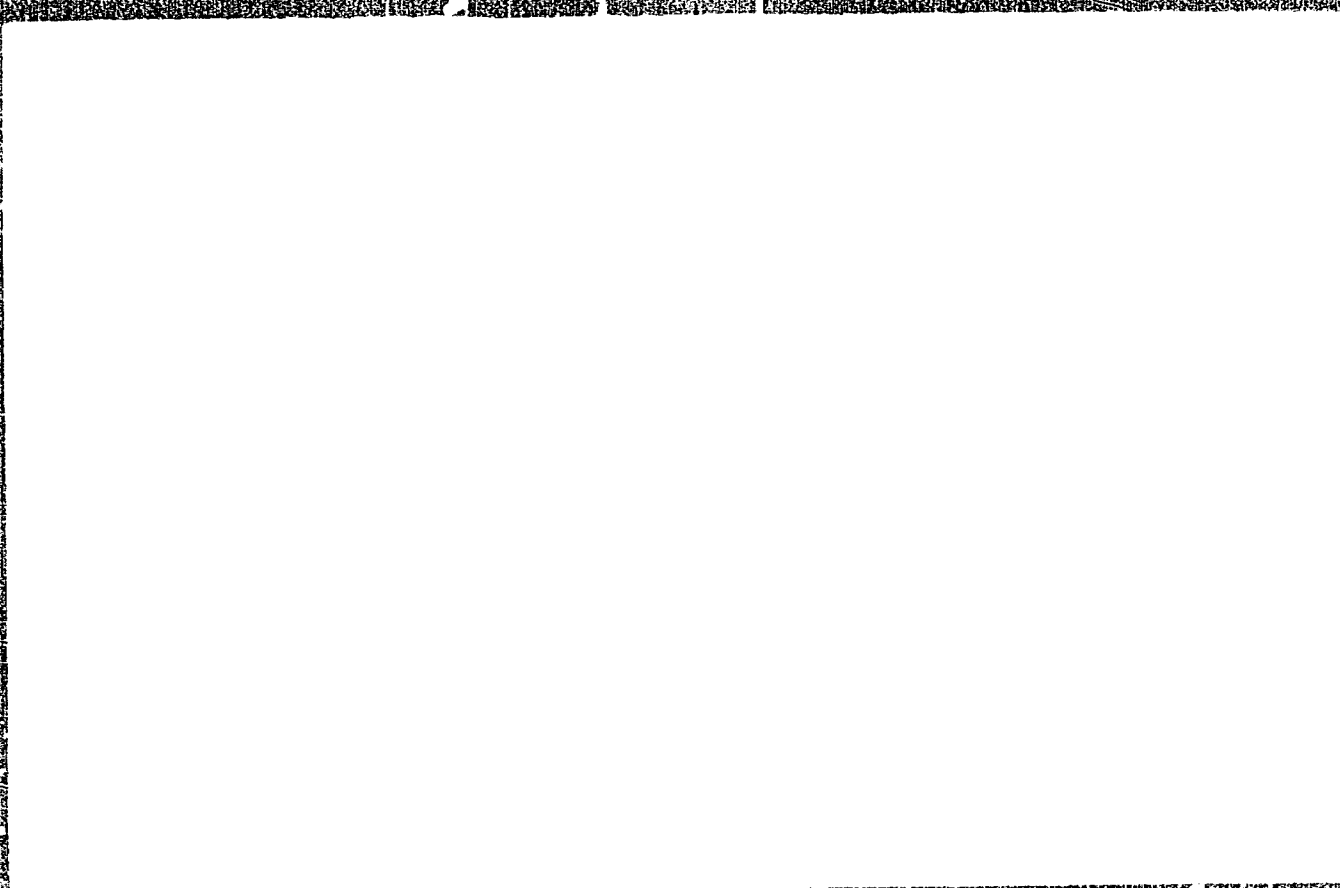


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BALANDIN, Aleksey Aleksandrovich, akademik; AGRONOMOV, A.Ye.,
red.; YERMAKOV, M.S., tekhn. red.

[Multiplet theory of catalysis] Mul'tipletnaia teoriia
kataliza. Moskva, Izd-vo Mosk. univ. Pt.1. 1963. 101 p.
(MIRA 17:2)

SPITSYN, Vikt.I.; BALANDIN, A.A.; POBROSEL'SKAYA, N.P.; D'YACHKOVA, R.A.

Catalytic dehydration of cyclohexanol over magnesium sulfate
doped with protactinium-231. Izv. AN SSSR. Ser.khim. no. 3:
564-565 Mr '64. (MIRA 17:4)

1. Institut fizicheskoy khimii AN SSSR i Moskovskiy gosudarstvennyy
universitet im. Lomonosova.